West Coast Spotlight Article

The U.S. Pacific Tuna Industry

Because of its size and scope relative to output in other U.S. fisheries, and because canned tuna consistently ranks highest in U.S. per capita consumption, the U.S. tuna industry is of national importance in terms of fisheries production, fisheries policy and management, international trade, and foreign relations. It presents an interesting case study in fisheries management as the history of the industry traces out many of the characteristics of an open-access fishery. The industry has had a dynamic history and in recent years has undergone some significant changes mainly in response to: 1) unprecedented growth in international production and trade in raw-frozen and canned tuna, 2) conditions of access to distant water fishing grounds, and 3) domestic marine mammal policies.

While other U.S. tuna operations, such as the production and marketing of fresh tuna, have become increasingly important, they are still relatively minor and are not covered in this report. The material presented in this section has been drawn from annual U.S. tuna industry reviews (Herrick and Koplin, 1986, 1987; Parks et al., 1990) and U.S. tuna industry investigations by the U.S. International Trade Commission (USITC, 1990, 1992).

HARVESTING SECTOR

Market Overview

U.S. tuna harvests and harvests by foreign sources determine the supply of raw tuna available to U.S. processors. Factors that directly affect both domestic and foreign tuna harvests include the condition of global tuna stocks, quantity and quality of fishing effort, and exogenous influences such as weather. The condition of global tuna stocks is largely decided by biological and environmental factors beyond the sway of market forces. Fishing effort is influenced to a great degree by markets for both raw and canned tuna, the primary market force being price. Also, the supply of imported raw tuna is strongly affected by competition in global raw-tuna markets.

Ex-vessel demand for raw tuna is determined mainly by the raw material requirements of U.S. canned tuna processors, which in turn are directly affected by conditions in the domestic market for canned tuna. U.S. processors rely foremost on a steady supply of domestically caught raw tuna, supplemented with imports to meet total raw tuna requirements.

Tropical Tuna Production

The harvesting sector of the U.S. tuna industry is dominated by large purse seiners that average greater than 1,000 tons hold capacity. Approximately 97% of the total U.S. tuna harvest is landed by the purse seine fleet. U.S. purse seiners harvest tropical tuna species (primarily skipjack and yellowfin tuna) which are canned as light meat tuna. Skipjack and yellowfin tuna harvests come from stocks that are most abundant along the Pacific coasts of Central and South America and among the island nations of the western tropical Pacific (WTP).

Between 1984 and 1993, the size of the U.S. tropical tuna purse seine fleet declined substantially (Table 1). The initial decline represented a continued response to conditions that developed in the industry during the late 1970's. Before then, the processing and harvesting sectors of the U.S. tuna industry were highly integrated. Processors became partners in vessel ownerships and entered into other forms of long-term contractual arrangements with independently owned vessels to assure steady supplies of tuna. By the late 1970's however, many foreign countries had begun to develop their own large-scale purse seine fleets, which led to a substantial increase in the supply of raw tuna available to U.S. processors. To take advantage of this new supply of low-cost tuna and become more competitive with aggressive foreign processors, U.S. processors began divesting them-

selves of interests in U.S. vessels. Without processor backing, many vessels had to leave the fishery.

Adding to their difficulties, U.S. tuna vessels were increasingly being denied access to tuna resources within the exclusive economic zones (EEZ's) of nations bordering the eastern tropical Pacific (ETP). Also at this time, an unusually strong El Niño event led to reduced availability of tuna resources in the ETP. This combination of events, plus potentially more abundant tropical tuna resources in the WTP as well as a shift of the U.S. processing facilities to the WTP, contributed to a major shift of U.S. purse-seine operations from the ETP to the WTP.

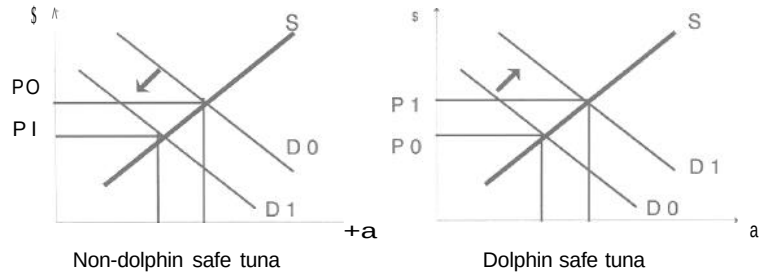
The move to the WTP required major technological changes to vessels that were originally designed to fish in the ETP, a sizable capital investment which made the move economically infeasible for many vessels. Many of the purse seiners that did not adapt either left the fishery or were sold to foreign-flag enterprises for use in the same tuna fisheries. This further contributed to the supply of foreign-caught tuna.

By 1987, the number of active U.S. tropical tuna vessels had stabilized and remained stable through 1989 (Table 1). During that period, the number of vessels operating in the ETP and WTP was fairly evenly split. Following the El Niño, fishing conditions in the ETP improved and a number of vessels returned from the WTP or reentered the fishery. U.S. operations in the WTP continued, enhanced by a combination of improved access to tuna resources afforded by the South Pacific Tuna Treaty (35 U.S. purse seiners were licensed to fish under the Treaty in 1989; 44 were licensed in 1993) and by expanding markets for raw tuna, particularly in Southeast Asia.

Table 1
U.S. cannery receipts[1] of domestically caught skipjack and yellowfin tuna (light meat tuna species), 1984-93.

	Landings[2] in millions of pounds		Revenues in millions of dollars (1967)				
Year	Skipjack	Yellowfin	Skipjack	Yellowfin	Days fished (thousands)	Number[3] of vessels	Number of employees
1984	292.0	190.2	$121.8	$102.5	18.4	111	1,998
1985	186.0	245.9	55.4	106.8	16.2	94	1,692
1986	181.2	266.1	57.6	102.0	14.0	88	1,224
1987	174.6	327.6	62.5	146.1	15.6	76	1,368
1988	252.9	218.4	118.9	115.0	16.1	73	1,314
1989	206.1	236.1	76.6	104.8	15.1	75	1,350
1990	191.0	187.1	66.8	81.1	7.6	66	1,188
1991	257.2	76.2	83.5	27.6	8.0	61	1,098
1992	326.4	95.8	91.6	30.3	9.5	58	1,044
1993	312.5	95.5	93.5	32.3	10.9	55	990

[1]Cannery receipts are tuna delivered to U.S. processors. Excluded from cannery receipts are U.S.-caught tuna destined for export or for the fresh tuna market.
[2]May include some bigeye, blackfin, and bluefin tuna.
[3]Vessels making at least one trip during the year.
Based on average size purse-seine crew of 18.



Tuna-dolphin issue: canned tuna products were differentiated between those tuna that were harvested without setting on dolphins and those that did. Changes in consumer preferences for "dolphin-safe" tuna shifted the demand outward for tuna harvested that way, increasing the equilibrium price and quantity.

Landings and Revenue

Although the reduction in U.S. purse seine fleet capacity was largely responsible for an overall decline in cannery deliveries during the 1984-93 period, the annual patterns in fleet numbers and domestic cannery deliveries do not exactly coincide (Table 1). The total real ex-vessel value of U.S. tropical tuna cannery deliveries ranged from a high of $234 million in 1988 to a low of $111 million in 1991, reaching $126 million in 1993.

The "Dolphin-safe" Policy

In the ETP, yellowfin tuna are frequently found in large schools that associate with various species of dolphins. Purse seine fishermen take advantage of this association by setting their nets around dolphin schools. This procedure, known as "dolphin fishing," usually catches the relatively large, highly valued yellowfin tuna that are located below the dolphins. In the process of retrieving the net, dolphins sometimes become inadvertently entangled and drown (Perrin, 1969; Green et al., 1971). To alleviate consumer fears that dolphins were being imperiled, U.S. canned

Table 2
U.S. cannery receipts of domestically caught albacore (white meat tuna), 1984-93.

Year	Landings (million pounds)	Revenues (1987 million dollars)	Days fished	Number of vessels	Number of employees[1]
1984	27.8	19.1	55,203	1,400	4,200
1985	13.7	7.9	27,417	950	2,850
1986	7.1	4.0	23,402	700	2,100
1987	5.7	4.2	17,165	800	2,400
1988	15.3	12.4	19,158	400	1,200
1989	9.8	8.1	17,705	400	1,200
1990	13.9	10.8	15,060	450	1,350
1991	12.9	8.4	17,950	200	900
1992	13.7	12.0	22,456	600	1,800
1993	15.0	12.2	31,094	650	1,950

[1]Based on an average troller crew of three.

tuna processors instituted a "dolphin-safe" policy in April, 1990 (USITC, 1992).

U.S. processors refused to buy tuna from suppliers who could not certify that the tuna was "dolphin-safe." Under the International Dolphin Conservation Act[1], the "dolphin-safe" policy, indicating that tuna processed into canned tuna were harvested using methods not harmful to dolphins, became a statutory requirement. The Act essentially precludes purchases of any tuna caught in the course of dolphin fishing in the ETP, since some incidental dolphin mortality is unavoidable in this method of fishing. As a result of the dolphin-safe policy, the U.S. fleet virtually abandoned the ETP, relocating to the WTP where dolphins and tunas do not have the same association. Those vessels that could not make this transition either remained in the ETP and fished using methods that did not endanger dolphins or left the fishery.

The significant increase in skipjack receipts and decline in yellowfin receipts beginning in 1991 reflects the shift of the U.S. fleet from the ETP to the WTP in response to the dolphin-safe policy. Before implementation of the policy, U.S. purse seiners operated mainly in offshore waters of the ETP where large yellowfin dominated harvests. In contrast, skipjack dominate harvests in the WTP. Because ex-vessel prices for skipjack and yellowfin are differentiated by size and species (large yellowfin [>20 pounds] command the highest price), the shift to the WTP represented a change from a low-volume, high-value operation to a high-volume but low-value operation.

[1]The Dolphin Protection Consumer Information Act (PL 101-627) of 1990 contained a labeling standard for tuna voluntarily labeled as "dolphin safe." Non-dolphin safe tuna was still allowed in the U.S. market. Under the International Dolphin Conservation Act of 1992, a statutory dolphin-safe U.S. market became law.

Extended Jurisdiction

Before 1992, tuna resources were excluded from U.S. jurisdiction under its 200-n.mi. EEZ, and the U.S. did not recognize other nations' claims to jurisdiction over tuna within their EEZ's. However, amendments to the Magnuson Fishery Conservation and Management Act (MFCMA), which became effective in January 1992, reversed those policies. Under the new conditions, renewal and establishment of agreements such as the South Pacific Tuna Treaty of 1987, which provides U.S. tuna harvesters with expanded access to tuna resources within foreign zones, have become extremely important.

Production of Albacore Tuna

The remaining U.S. tuna cannery harvest consists mainly of albacore tuna, a temperate tuna species, caught using troll vessels and processed exclusively as white-meat tuna. (Albacore is the only tuna species that can be canned as white-meat tuna in the United States.) U.S. albacore trollers are relatively small, with an average hold capacity of 20-25 tons, although there is a recently developed U.S. fleet of distant-water trollers with carrying capacities averaging about 70 tons. About 600 small trollers participate annually in the north Pacific albacore fishery, usually within 300 miles of the California, Oregon, and Washington coasts. Unlike purse seiners, these vessels are easily adapted for use in other fisheries, such as salmon or crab. Consequently, most Pacific coast trollers will alternate between the albacore, salmon, and crab fisheries during the course of the year, depending upon the relative availability and prices of these species. This accounts for the great variability in the number of trollers participating in the North Pacific albacore fishery on an annual basis (Table 2). The larger, distant-water U.S. trollers first appeared with the development of the U.S. south Pacific albacore troll fishery in 1986. Since that time, about 40 U.S. trollers have consistently participated in the fishery. Because of the technology employed and

the nature of the albacore itself, the U.S. albacore harvesting sector is completely "dolphin-safe."

There was a tremendous decrease in albacore cannery deliveries by U.S. vessels from 1984 to 1987 (Table 2). In 1988, albacore deliveries increased sharply then fluctuated through 1990, with a similar pattern for ex-vessel value. Between 1991 and 1993, albacore deliveries and ex-vessel values increased steadily reaching 15 million pounds, with a real value of $12.2 million in 1993. The recent increase in the value and volume of U.S. albacore deliveries can be largely credited to the U.N. prohibition on the use of large-scale driftnets on the high seas which went into effect 31 December1992 (USITC, 1992). The driftnet prohibition was followed by a sharp drop in the global supply of albacore and a corresponding increase in raw albacore prices in the international market. Higher prices are likely to persist in the near term since the supply shortfall cannot be readily made up with currently available methods (e.g., trollers) as with the highly efficient driftnets. It is likely that the higher prices, combined with an anticipated increase in albacore stocks as a result of the driftnet ban, will attract additional U.S. trollers into the North and South Pacific fisheries.

PROCESSING SECTOR

Market Overview

The overall supply of canned tuna in the U.S. market is determined by the level of domestic processing and the volume of imports. The supply of U.S.-processed canned tuna is influenced by U.S. canned tuna prices, raw material availability, and production costs. The quantity of U.S. canned tuna imports is influenced by the same factors that affect domestic supply as well as conditions in alternative markets.

The demand for canned tuna in the U.S. is mainly determined by population, the price of canned tuna relative to competing products, real disposable income, and consumer preferences. A notable shift in preferences was the change from tuna packed in oil to tuna packed in water during the 1980's as U.S. consumers became increasingly more health and nutrition conscious. Also, demand has been particularly sensitive to consumer concerns over dolphin mortality in tuna fishing as discussed above. Most canned tuna is distributed through retail outlets, and price competition with other foodstuffs, particularly ground beef, chicken, pork, and canned salmon, is strong.

Canned Tuna Production

U.S. tuna processors produce canned tuna for human consumption and byproducts, primarily tuna-based pet foods. Canned tuna for human consumption is available in an assortment of packs distinguished by type of meat (white or light), packing medium (water or oil), and form (chunk, solid, flake, and grated). Light meat accounts for 75-80% of annual domestic canned tuna consumption; albacore or white meat makes up the balance. Chunk, light meat in water is the most popular light meat pack, although there still appears to be a core demand for oil-packed canned light-meat tuna. Albacore is packed almost exclusively in water in solid form. Canned tuna is marketed in both retail size and institutional size containers.

U.S. processors use either domestic or imported raw (fresh, chilled, or frozen) tuna as raw material in the production of canned tuna, with near perfect substitutability. During 1984-93, domestically caught tuna made up about 45-55% of processors' raw tuna requirements. Yellowfin and skipjack tuna accounted for 95-99% of domestically caught cannery receipts during the period; foreign caught cannery receipts consisted almost entirely of yellowfin and skipjack tuna and albacore.

Tuna-Dolphin Issues

During the 1984-93 period, there were several events that had a significant impact on the way raw tuna was obtained by U.S. processors. First, there was more rigorous enforcement of provisions in the Marine Mammal Protection Act (MMPA) that enacted primary[2] and secondary import embargoes[3] on imported tuna harvested using means that result in an incidental kill of dolphins exceeding U.S. standards. Primary embargoes were placed on direct imports from harvesting nations whose harvests did not meet U.S. dolphin mortality standards. Secondary embargoes were placed on intermediary nations in cases where there was an attempt to circumvent a primary embargo through trans shipment.

[2] 16 U.S.C. 1371(a)(2)(B)(ii)(II)

[3] 16 U.S.C. 1371(a)(2)(C)

Table 3
U.S. processing of canned light meat tuna, continental U.S., Hawaii, American Samoa, and Puerto Rico, 1984-93.

Year	No. of Plants	Million pounds	Value (1987 million dollars)	No. of employees
1984	11	477.5	676.5	11,026
1985	8	413.1	583.6	11,293
1986	8	479.5	578.6	12,198
1987	8	511.1	704.1	11,546
1988	9	467.0	618.9	12,145
1989	9	549.0	656.6	12,435
1990	9	448.6	508.0	10,672
1991	7	470.8	506.2	10,398
1992	7	464.9	432.0	9,366
1993	7	468.8	429.6	9,207

Table 4
U.S. processing of canned white meat tuna, continental U.S., Hawaii, American Samoa and Puerto Rico, 1984-93.

Year	No. of Plants	Million pounds	Value (1987 million dollars)	No. of employees
1984	16	136.7	281.0	11,099
1985	14	131.9	285.9	11,368
1986	13	157.3	331.1	12,267
1987	12	139.9	312.4	11,602
1988	15	131.2	305.3	12,189
1989	13	137.3	318.3	12,440
1990	13	131.9	288.9	10,736
1991	16	121.6	238.5	10,493
1992	15	144.1	301.1	9,444
1993	12	150.0	302.4	9,293

Second, the processors' own dolphin-safe policy curtailed imports from nations whose harvests were made using methods harmful to dolphins. These two events drastically reduced yellowfin tuna from the ETP as a source of raw material for U.S. processors. As discussed, the International Dolphin Conservation Act (IDCA) of 1992 made processors' dolphin-safe policy into U.S. law. To make up for the yellowfin shortfall, U.S. processors began using more skipjack tuna, primarily from U.S. harvests in the WTP, and imported raw tuna from a wider variety of sources.

Development of Loining Technology

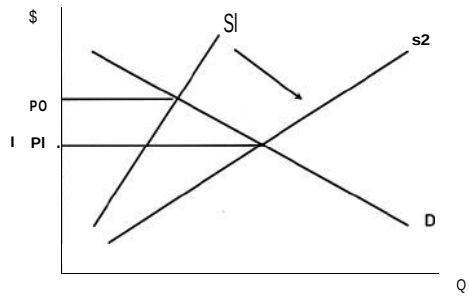
A third consideration affecting processors' use of raw material inputs was the development of tuna loining technology which to some extent shifted raw material inputs from whole tuna to precooked, frozen tuna loins. Loins are free of waste material (bone, viscera, etc.) and are that portion of the whole fish that is converted to canned product. The use of loins represents a significant reduction in labor costs, as at least 60% of the total labor cost in traditional tuna processing plants is incurred from their production of loins. In addition to reduced production costs, there can be a substantial savings in freight costs from using loins. Depending on the size and species of tuna, the loin can weigh less than half the amount of the whole fish since waste material is not transported with loins.

Industry Restructuring

Up until the 1980's, southern California was the processing hub for the U.S. tuna industry. However, it was at this time that a number of adversities beset U.S. processors, including declining revenues, rising production costs, and increased competition from canned imports. To overcome these difficulties, U.S. processors shifted the bulk of their operations to offshore sites in American Samoa and Puerto Rico to take advantage of latent production capacity, greater resource availability, lower labor costs, significant tax benefits, and savings realized from consolidating operations. By 1985, only one major processing plant was still operating in California, while seven plants operated in Puerto Rico and America Samoa, and six small plants (less than 1% of total U.S. canned tuna production) produced only white meat tuna in Oregon and Washington. By 1993, there were two large-scale plants in California, three in Puerto Rico, and two in America Samoa processing both light and white meat tuna (Tables 3, 4). Also, during this time, two of the three major U.S. tuna processing operations had been acquired by Thai and Indonesian interests.

Plants and Employment

Employment figures and the number of plants in operation at all U.S. cannery locations for the period 1984-93 are presented in Tables 3 and 4. The most meaningful trends in cannery employment and plant operations can be derived from employment figures for light-meat processing presented in Table 3, because the large-



U.S. tuna canneries have faced increasing costs due to higher relative wages, resulting in a shift **in production to lower-wage countries.**

Table 5
U.S. processing of canned white and light meat tuna, continental U.S., Hawaii, American Samoa, and Puerto Rico, 1984-93.

Year	No.of Plants	Total production (million pounds)	Total value (1987 million dollars)	No.ot employees	Percent lightmeat	Percent white meat
1984	16	614.2	957.5	11,099	78	22
1985	14	545.0	889.5	11,368	76	24
1986	13	636.8	909.7	12,267	75	25
I987	12	651.0	1,016.5	11,602	79	21
I988	15	598.2	924.2	12,189	70	22
1989	13	686.3	974.9	12,440	80	20
1990	13	580.5	796.8	10,736	77	23
I991	16	592.4	744.7	10,493	79	21
1992	15	609.0	733.0	*9,444*	76	24
I993	12	618.8	732.0	9,293	76	24

scale plants and production volumes presented therein account for the bulk of employment in the U.S. tuna processing sector. Information from Tables 3 and 4 is combined in Table 5 to provide a clearer picture of overall employment and plant operations during the 1984-93 period.

As shown in Table 5, cannery employment declined between 1984 and 1993, but not continuously. During 1984-86, employment rose while the number of large-scale plants decreased, reflecting the consolidation of U.S. processing operations offshore and increased use of lower-cost labor. After a decrease in 1987, cannery employment rose in 1988-89 mainly due to increased production at offshore facilities. During 1990-93, there was a steady decline in cannery employment as loin-based processing expanded (a California plant specifically designed for loin processing opened in 1990), and two plants shut down in Puerto Rico. The Puerto Rico plant closures followed enactment of the dolphin-safe policy which, due to Puerto Rico's dependency on yellowfin tuna from the ETP, was the cannery location most affected by the policy and MMPA import embargoes. With the overall increase in canned tuna production during 1984-93, accompanied by a decline in the number of active plants and total cannery employment, canned tuna productivity improved both in terms of output per plant and output per worker.

TRADE SECTOR

Raw-FrozenTuna

Following the closure of U.S.-mainland processing plants in the 1980's there was a substantial increase in frozen tuna exports by the U.S. tuna fleet. Most of the exports consisted of tropical tuna caught by U.S. purse seiners in the WTP. For the most part, these catches were transshipped from sites such as Tinian and Guam to Asian processors; Indonesia and Thailand were the primary destinations. Licensing arrangements between Thai and U.S. processors to ship canned tuna to the U.S. market, and the purchase of U.S. canneries by Indonesian and Thai interests, led to increased raw material requirements at plants in these areas. These needs have been largely met by exports from foreign fleets.

The rise in the value of exports in 1990 (Table 6) is mainly attributable to increased exports of large yellowfin tuna, as the U.S. processors' dolphin-safe policy came into effect and U.S. harvesters diverted their ETP yellowfin catches to foreign canners. Exports of skipjack tuna have increased since 1991 while yellowfin tuna exports have decreased, reflecting the increase in U.S. fishing activity in the WTP.

In comparison, U.S. imports of frozen tuna dwarf exports. Imports frequently make up more than half the total annual U.S. cannery supply of frozen tuna. Albacore usually dominates U.S. imports of frozen tuna in both quantity and value; skipjack and yellowfin tuna follow (Table 6). The dominance of imports in U.S. foreign trade in frozen tuna has led to the imbalances shown in Table 7.

Canned Tuna

U.S. exports of canned tuna are trifling compared with imports (Table 6). This is primarily due to the lack of U.S. competitiveness in the major foreign canned tuna markets, particularly Japan and the European Community. Factors that make it difficult for U.S. processors to penetrate foreign markets include: relatively high duties in foreign markets, high transportation costs from relatively remote production locations (American Samoa and Puerto Rico), noncompatible product and quality specifications that would increase production costs, competition from low-cost Asian product, and the presence of large, well-established tuna industries in France, Spain, and Italy.

The tremendous increase in U.S. imports of canned tuna which began in the early 1980's (Table 6) was mainly due to a shift in consumer dietary preferences from tuna packed in oil to tuna packed in water. Combined with a disparate tariff on tuna canned in water, this created an unprecedented opportunity for canned imports (virtually all light meat in water) to inundate the domestic market. Thailand has been the main source of canned imports followed by the Philippines and Taiwan. The value of canned imports peaked in 1989 following the ownership changes in the industry, then fell off sharply in 1990 as the U.S. market became saturated (Table 6). In 1991, there was a significant rebound in the value of canned imports as volumes reached a record high. Since then there has been a drop in value that has been attributed to production problems in Southeast Asia and a shift in their canned tuna exports to European markets. As in the case of frozen tuna, there is a significant foreign trade imbalance in canned tuna (Table 7).

Table 6
Exports and imports of frozen and canned tuna, 1984-93 (in 1987 million dollars).[1]

Item	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Frozen tuna exports										
Albacore						0.1	0.4	0.1	0.6	0.6
Skipjack						0.6	0.5	0.3	0.3	0.5
Yellowfin						0.1	1.1	1.6	0.6	0.4
Unspecified						2.4	4.3	1.4	1.1	0.6
Total						3.2	6.4	3.4	2.6	2.1
Frozen tuna imports										
Albacore	148.6	141.1	157.0	171.9	194.8	179.1	126.1	100.1	170.4	169.1
Skipjack	96.4	69.3	83.4	72.6	93.6	84.0	55.7	26.4	34.8	31.8
Yellowfin	30.1	45.1	48.4	63.3	43.8	60.4	22.8	25.7	9.2	13.0
Total	275.1	255.5	288.8	307.8	332.2	323.4	204.7	152.2	214.4	213.8
Canned tuna exports										
All types[2]						8.5	11.7	13.3	10.7	8.5
Canned tuna imports										
In oil										
Unspecified	0.5	0.6	0.7	1.0	0.7	0.8	1.0	0.8	0.7	0.6
In water										
White	17.9	16.5	15.9	26.8	49.9	57.5	49.1	38.7	26.5	12.6
Light	165.2	204.4	219.4	160.3	221.6	261.3	193.6	247.6	219.3	156.2
Total	183.6	221.6	236.0	188.1	272.1	319.6	243.7	287.0	246.5	169.4

[1]Excludes frozen tuna exports from canneries in American Samoa.
[2]Includes exports under the tariff code "tuna nspf prepared/preserved," which contains loins (nspf=unspecified).

Table 7
Frozen and canned tuna trade balances, 1989-93 (in 1987 million dollars).

Year	1989	1990	1991	1992	1993
Frozen tuna trade balance	-320.2	-198.2	-148.8	-211.8	-211.7
Canned tuna trade balance	-311.2	-232.1	-273.7	-235.8	-160.9

CONCLUSIONS

This description of the U.S. Pacific tuna industry exemplifies the way in which economic forces help shape the development and evolution of a fishery. For example, in just the 10-year period encompassed in this spotlight article, the fleets in the yellowfin and skipjack tuna and albacore fisheries have significantly declined and have decreased the number of fishing days in response to reduced financial support from processors, declining stock levels, and increased competition from foreign harvesters; tuna vessels have shifted their operations between the ETP and WTP in response to changing market and resource availability conditions; and they have changed harvest methods and target species to accommodate the MMPA and other Acts enacted out of consumer concern for dolphin bycatch. The tuna processing industry has been similarly shaped, moving operations to overseas sites to take advantage of lower labor costs, tax benefits, and increased resource availability; technological changes in processing have lowered labor costs significantly; MMPA embargoes and dolphin-safe policies altered the sources and species of tuna acceptable for processing; and domestic processors were negatively impacted by the shift in consumer preferences and, hence, demand for tuna packed in water rather than in oil. In all cases, harvesters and processors have acted rationally, and predictably, to the economic, regulatory, and biological forces at work.

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